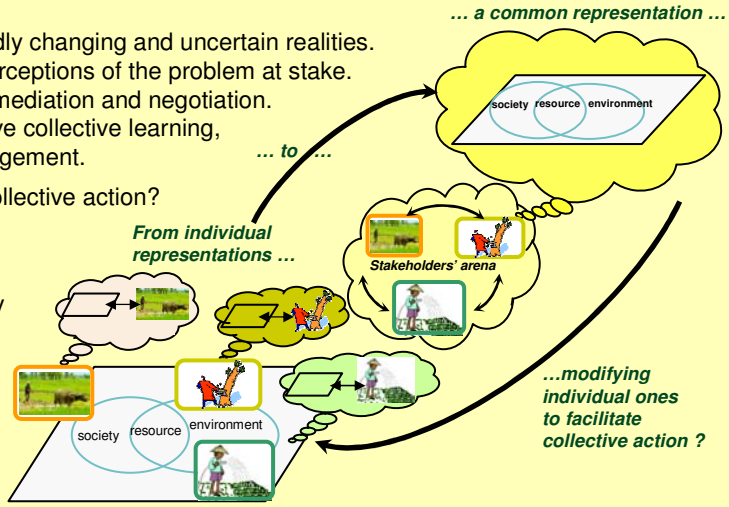
PN 25 Companion Modeling for resilient water management

Stakeholders' perceptions of water dynamics and collective learning at catchment scale

Water management problems tend to be complex and take place in rapidly changing and uncertain realities. A growing number of stakeholders are involved with own interest and perceptions of the problem at stake. Their points of view are legitimate and need to be incorporated through mediation and negotiation. The approach needs to reconcile ecological and social dynamics, improve collective learning, coordination mechanisms, and stakeholders' capacity for adaptive management.

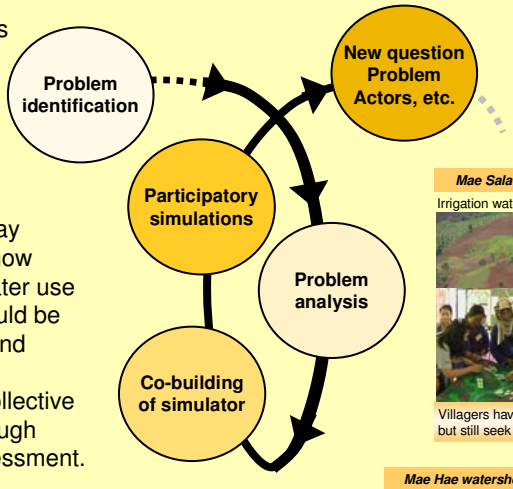
How to model and integrate different stakeholders' perceptions for collective action?



A common ComMod approach and methodological framework

Companion **Mod**eling is an interactive process facilitated by evolutionary models used as mediating tools to support dialogue, shared learning & collective decision-making. The modeling and simulation activities are driven by end users interest. Stakeholders (incl. researchers) learn together by creating, modifying, observing and assessing simulations. Knowledge, perceptions, behavior, and practices evolve along the process and can lead to collective action plans and better community mobilization to implement them.

ComMod uses conceptual models, role-playing games, and agent-based simulators in an iterative way to represent how competing water use processes could be coordinated and to search for acceptable collective solutions through scenario assessment.



Main phases of an iterative ComMod process

Achievements and outcomes at seven diverse sites

ComMod processes were implemented in different agro-ecological zones and socio-cultural contexts to examine diverse water management problems leading to a variety of key outcomes

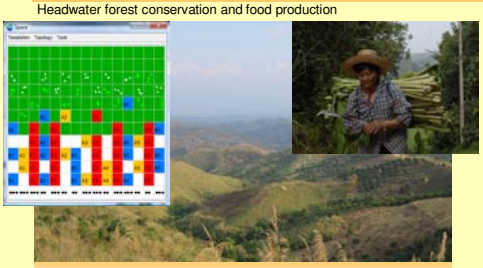
Mae Salaep catchment, Chiang Rai Province Northern Thailand

Irrigation water sharing among types of plantation owners

Villagers have designed an action plan for new water infrastructure but still seek support from sub-district administrators.

Tha Wang Pha District, Nan province, Northern Thailand

Headwater forest conservation and food production



Improved communication between foresters and villagers about gathering of non timber forest products by resource-poor households.

Mae Hae watershed, Chiang Mai Province, Northern Thailand

Upstream-downstream interactions & institutional coordination

Strengthened local institutions & agreement on water use regulation.

Lam Dome Yai watershed, Ubon Ratchathani, Northeast Thailand

Interaction between land/water use in rice and labor migrations

The co-design of a ABM has increased farmers' ability to understand rainfed lowland rice farming & labor management dynamics.

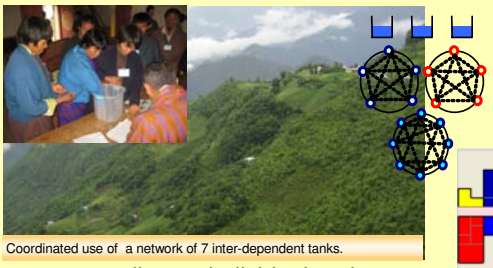
Lingmuteychu watershed, Punakha District, West central Bhutan

Irrigation water sharing at rice transplanting among villages & institutional dynamics

Creation of an operational watershed resource management committee.

Kengkhar village, Mongar District, Eastern Bhutan

Water scarcity for domestic use, cropping and animal rearing



Coordinated use of a network of 7 inter-dependent tanks.

Bac Lieu Province, Mekong delta, Vietnam

Water salinity management for rice and shrimp production

Downstream shrimp producers reached an agreement with upstream rice growers on the timing of saline water intake at the sluice gate.

Key findings and lessons learnt

This collaborative modeling approach can be used to better understand a water management complex system, or to facilitate collective decision-making in multi-stakeholders platforms. Depending on process dynamics, ComMod processes create diverse individual and collective effects on stakeholders: knowledge acquisition and exchange, changes in own and others perceptions, behavior, decision-making and practices, engagement and community mobilization, etc.

Role-playing games are taken seriously and meet stakeholders' interest. Agent-based models are more efficient to simulate scenarios and allow stakeholders to explore prospective futures collectively. ABMs are also useful to communicate simulation results to larger groups.

ComMod works better when a supporting community-based resource management policy is in place. The management of social inequalities, power relations and linkages with institutions at higher levels of organization are crucial, especially for up-scaling ComMod.

For more information http://www.cpwf25.sc.chula.ac.th http://www.ecole-commod.sc.chula.ac.th http://www.commod.org http://cormas.cirad.fr

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